

TECHNICAL MANUAL

OPERATOR'S MANUAL

**MULTIPLE INTEGRATED LASER
ENGAGEMENT SYSTEM
(MILES 2000)**

FOR

**CONTROLLER DEVICE/TRAINING DATA
TRANSFER DEVICE (CD/TDTD)**

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

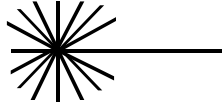
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27 MAY 2002



LASER WARNING

Suitable precautions must be taken to avoid possible damage to the eye from overexposure to radiated laser energy. Precautionary measures include the following:

- **NEVER fire the laser** at personnel within 10 meters.
- **NEVER look at the laser transmitter** through magnifying optics such as binoculars, telescopes, or periscopes at ranges less than 40 meters.

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TD 63-6920-703-10
TM 6920-10/4

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TABLE OF CONTENTS

	<u>PAGE</u>
HOW TO USE THIS MANUAL	b
CHAPTER 1 INTRODUCTION	1-1
SECTION I GENERAL INFORMATION	1-1
1.1 Scope	1-1
1.2 Maintenance Forms and Records	1-1
1.3 Reporting Equipment Improvement Recommendations (EIRS)	1-1
1.4 Corrosion Prevention and Control	1-1
1.5 Preparation for Storage or Shipment	1-2
1.6 List of Abbreviations and Glossary	1-2
1.7 Safety, Care, and Handling	1-5
SECTION II EQUIPMENT DESCRIPTION AND DATA	1-6
1.8 Equipment Characteristics, Capabilities, and Features	1-6
1.8.1 Equipment Characteristics	1-6
1.8.2 Capabilities and Features	1-6
1.9 Location and Description of Major Components	1-6
1.10 Equipment Data	1-6
SECTION III. THEORY OF OPERATION	1-7
1.11 BASIC PRINCIPLES OF OPERATION	1-7
1.11.1 Principles of Operation (MILES 2000)	1-7
1.11.2 Principles of Operation (CD/TDTD)	1-7
CHAPTER 2 OPERATING INSTRUCTIONS	2-1
SECTION I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS	2-1
2.1 Equipment Figures and Tables	2-1
SECTION II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)	2-3
2.2 Introduction to PMCS Table	2-3
SECTION III. OPERATION UNDER USUAL CONDITIONS	2-4
2.3 Assembly and Preparation for Use	2-4
2.3.1 Installation Procedures	2-4
2.4 Initial Adjustments before Use, Daily Checks, and Self-Test Requirements	2-4
2.5 Operating Procedures	2-4
2.5.1 Setting Time/Date in System Mode	2-4
2.5.2 Performing Built-In-Test (BIT)	2-4
2.5.3 Uploading Setup Information from MILES After-Action Review System (MARS)	2-5
2.5.4 Uploading Setup Information from CD/TDTD to CVS, IWS, Surrogate Weapons, and Target Systems	2-7
2.5.4.1 Uploading Setup Information from CD/TDTD to CVS and IWS	2-7
2.5.4.2 Uploading Setup Information from CD/TDTD to Surrogate Weapons	2-7
2.5.4.3 Uploading Setup Information from CD/TDTD to MILES Target Interface Device	2-8
2.5.5 Modifying Player Identification (PID)	2-8
2.5.5.1 Modifying PID for Individual Player	2-8
2.5.5.2 Modifying PID for Vehicle	2-9
2.5.6 Downloading Events	2-9
2.5.6.1 Downloading Events from IWS Console (DPCU)	2-9
2.5.6.2 Downloading Events from Vehicles	2-10
2.5.6.3 Downloading Events from Surrogate Weapons	2-10
2.5.6.4 Downloading Events to the MARS PC	2-10
2.5.7 Clearing Events from CD/TDTD Memory	2-11

TABLE OF CONTENTS-Continued

	<u>PAGE</u>
2.5.8	Resetting/Resurrecting Individual Players and Vehicles..... 2-11
2.5.8.1	Resetting Individual Players and Vehicles 2-11
2.5.8.2	Resurrecting Individual Players and Vehicles 2-12
2.5.8.3	Killing Individuals and Vehicles 2-12
2.5.8.4	Setting IWS and CVS into Control Mode 2-12
2.5.9	Testing Procedures 2-12
2.5.9.1	Testing the IWS..... 2-12
2.5.9.2	Testing the Vehicle MILES 2000 System 2-13
2.5.9.3	Selecting Specific Weapons to Test the Vehicle MILES 2000 System 2-13
2.5.10	Time Synchronization 2-22
2.5.10.1	Time Synchronizing Units..... 2-22
2.5.10.2	Time Synchronizing CD/TDTDs 2-22
SECTION IV.	OPERATION UNDER UNUSUAL CONDITIONS 2-24
2.6	Assembly and Preparation for Use under Unusual Conditions 2-24
2.6.1	Unusual Environment/Weather 2-24
2.6.2	Fording and Swimming 2-24
2.6.3	Emergency Procedures. 2-24
SECTION V.	FUNCTIONAL CHECKS 2-25
2.7	Functional Test Procedures 2-25
2.7.1	Built-In-Test (BIT) 2-25
CHAPTER 3	OPERATOR MAINTENANCE INSTRUCTIONS 3-1
SECTION I.	TROUBLESHOOTING 3-1
3.1	Troubleshooting Procedures..... 3-1
SECTION II.	OPERATOR MAINTENANCE..... 3-2
3.2	Operator Maintenance Procedures. 3-2
3.2.1	CD/TDTD Removal 3-2
3.2.2	CD/TDTD Replacement..... 3-2
3.3	Disassembly Procedures for the CD/TDTD 3-2

TD 63-6920-703-10
TM 6920-10/4

LIST OF FIGURES

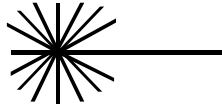
		<u>PAGE</u>
1-1	CD/TDTD Transit Case	1-9
2-1	Controller Device Training Data Transfer Device (CD/TDTD)	2-1
2-2	Uploading/Downloading Configuration	2-5
2-3	CD/TDTD - MARS Interface Box (Cradle)	2-6
2-4	CD/TDTD Operating Flowchart	2-14

LIST OF TABLES

		<u>PAGE</u>
1-1	List of Abbreviations	1-2
1-2	Glossary	1-4
1-3	Equipment Data	1-6
1-4	Kill Indication Chart	1-8
1-5	Kit/Equipment List	1-9
2-1	Operator Preventive Maintenance Checks and Services	2-3
2-2	List of MILES Vehicles/Weapons Codes	2-23
2-3	Built-In-Test (BIT)	2-25
3-1	MILES 2000 Troubleshooting Chart for CD/TDTD	3-1

TD 63-6920-703-10
TM 6920-10/4

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- **NEVER look at the laser transmitter** through magnifying optics such as binoculars, telescopes, or periscopes at ranges less than 40 meters.

For information on **FIRST AID**, refer to **FM 21-11**.

HOW TO USE THIS MANUAL

INTRODUCTION.

This manual contains operation instructions for the Multiple Integrated Laser Engagement System (MILES 2000), Tactical Engagement Simulation System (TESS), when configured with the Controller Device/Training Data Transfer Device (CD/TDTD).

MANUAL DESCRIPTION.

This manual is divided into three chapters. Chapters are further divided into sections. The chapter descriptions are provided in the following subparagraphs.

Chapter 1 is an introduction that provides general information, equipment description and data, and theory of operation.

Chapter 2 provides operating instructions.

Chapter 3 provides operator maintenance instructions.

CHAPTER 1 INTRODUCTION

SECTION I. GENERAL INFORMATION

1.1 SCOPE.

This manual describes how to install, operate, and maintain the Multiple Integrated Laser Engagement System (MILES 2000), Tactical Engagement Simulation System (TESS), when configured with the Controller Device/Training Data Transfer Device (CD/TDTD). The manual also explains all authorized operator maintenance. Refer any maintenance problems not covered to organizational maintenance personnel.

1.2 MAINTENANCE FORMS AND RECORDS.

Department of the Army forms and procedures used for equipment maintenance will be those described by DA PAM 738-750, The Army Maintenance Management System (TAMMS). Marine Corps personnel will use TM 4700-15/1, Equipment Record Procedures, and refer to the on-line MCPDS or Marine Corps Stocklist SL-1-2, Index of Technical Publications.

1.3 REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRs).

If your MILES 2000 equipment for Controller Device/Training Data Transfer Device (CD/TDTD) needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on a Quality Deficiency Report. Mail to us at Commander, Simulation, Training, and Instrumentation Command (STRICOM) ATTN: AMSTI-OPS-L; 12350 Research Parkway, Orlando, FL 32826-3276. We'll send you a reply. For U.S. Marine Corps personnel, submit SF-368 in accordance with MCO 4855.10 (Quality Deficiency Report) to: Commander, Marine Corps Logistic Base (Code G316-1), 814 Radford Boulevard, Albany, GA 31704-1128.

1.4 CORROSION PREVENTION AND CONTROL.

- a. Corrosion Prevention and Control (CPC) of Army material is a continuing concern. It is important that any corrosion problems with this item be reported so the problem can be corrected and improvements can be made to prevent the problem in the future.
- b. While corrosion is typically associated with rusting of metals, it can also include deterioration of other materials such as rubber and plastic. Unusual cracking, softening, swelling or breaking of these materials may be a corrosion problem.
- c. If a corrosion problem is identified, it can be reported using form SF-368. Use of key words such as "corrosion," "rust," "deterioration," or "cracking" will assure the information is identified as a CPC problem.
- d. The form should be submitted to Commander, Simulation, Training, and Instrumentation Command (STRICOM) ATTN: AMSTI-OPS-L; 12350 Research Parkway, Orlando, FL 32826-3276. U.S. Marine Corps personnel, submit SF-368 in accordance with MCO 4855.10 (Quality Deficiency Report).

1.5 PREPARATION FOR STORAGE OR SHIPMENT.

When receiving equipment for storage or shipment, always inspect the returned equipment for damage, breaks, cracks, and cleanliness.

1.6 LIST OF ABBREVIATIONS AND GLOSSARY.

Refer to Table 1-1 for the list of abbreviations used in this manual and to Table 1-2 for the glossary.

Table 1-1. List of Abbreviations

AAV	Assault Amphibious Vehicle
AC-DC	Alternating Current/Direct Current
ASAAF	Automatic Small Arms Alignment Fixture
ATWESS	Anti-Tank Weapons Effects Signature Simulator
AVCPS	Audio Visual Cue Pyrotechnic Simulator
BFA	Blank Firing Adapter
BIT	Built-In-Test
CD/TDTD (Controller Gun)	Controller Device/Training Data Transfer Device
CDA	Control Display Assembly
CPC	Corrosion Prevention and Control
CSWS	Crew Served Weapon System
CU	Control Unit
CVC	Combat Vehicle Crew
CVS	Combat Vehicle System
DC-DC	Direct Current/Direct Current
DIFCUE	Direct/Indirect Fire Cue
DPCU	Data Processing Control Unit
EIR	Equipment Improvement Recommendation
EOD	Explosive Ordnance Disposal
FCU	Fire Control Unit
FlashWESS	Flash Weapons Effects Signature Simulator
FU	Firing Unit
ID	Identification
I/O	Input/Output
IR	Infrared
ISU	Integrated Sight Unit
ITS	Independent Target System
IWS	Individual Weapons System
IWS Console (DPCU)	Individual Weapons System Console (Data Processing Control Unit)

TD 63-6920-703-10
TM 6920-10/4

Table 1-1. List of Abbreviations - Continued.

KSI	Kill Status Indicator
LAV	Light Armored Vehicle
LASER	Light Amplification by Simulated Emission of Radiation
LED	Light Emitting Diode
LTU	Laser Transmitter Unit
LU	Loader Unit
MARS	MILES After-Action Review System
MCS	Master Control Station
MG	Machine Gun
MGS	Missile Guidance System
MGSS	Main Gun Signature Simulator
MILES	Multiple Integrated Laser Engagement System
O/C	Observer Controller
OTPD	Optical Turret Positioning Device
PID	Player Identification
Pk	Probability of Kill
PMCS	Preventive Maintenance Checks and Services
PROM	Programmable Read-Only Memory
SAT	Small Arms Transmitter
SMAW	Shoulder-Mounted Assault Weapon
SWS	Surrogate Weapons System
TAMMS	The Army Maintenance Management System
TESS	Tactical Engagement Simulation System
TNB	Turret Network Box
TOW	Tube-Launched Optically-Tracked Wire-Guided Weapon System
ULT	Universal Laser Transmitter
Vac	Volts Alternating Current
Vdc	Volts Direct Current

Table 1-2. Glossary.

Administrative Kill	A kill assessed by a Controller for administrative purposes.
Automatic Small Arms Alignment Fixture (ASAAF)	Device used to align the Small Arms Transmitter (SAT) to the sights on a weapon.
Catastrophic Kill	A kill that totally disables a vehicle or individual.
Cheat Kill	A kill is assessed to a system when a tamper attempt has been detected.
Commo Kill	A kill that disables external communications.
Commo Override	Use the Control Unit USER INFO/ENTER push button to override the communications disable function under Communications/ Catastrophic Kill conditions in an emergency
Controller	An umpire or referee in a MILES 2000 training exercise.
Controller Device (CD/TDTD)	A device used by the Controller to upload, download and test the MILES 2000 system. (Controller Gun)
Direct/Indirect Fire Cue (DIFCUE)	A device that produces flash, noise, and smoke to simulate a vehicle being hit by direct or indirect fire.
Fastener Tape	A hook and pile type tape used to hold vehicle detector belts and other MILES 2000 equipment in place.
Firepower Kill	A kill that disables vehicle weapons.
Helmet Harness	The part of the IWS attached to the helmet or soft cover.
Hit	Simulated contact with incoming fire that does not result in a Kill.
Individual Weapons System (IWS)	The Helmet and Torso Harness assemblies and IWS Console (DPCU), which is worn by personnel. This equipment also includes the Small Arms Transmitter (SAT).
Kill	Refer to Catastrophic Kill, Commo Kill, Firepower Kill, or Mobility Kill
Kill Status Indicator (KSI)	A device attached to a vehicle that produces an external flashing light indicating a Hit, Near Miss or Kill.
LASER	Light Amplification by Stimulated Emission of Radiation. A narrow beam of light capable of transmitting information.
Laser Beam	In MILES 2000 equipment, an eye-safe, invisible beam of light that simulates weapons fire.
Laser Detector	A device that senses incoming laser beams.
Laser Transmitter	A device that transmits a laser beam.
Main Gun Signature Simulator (MGSS)	A device that produces a flash and bang to simulate main gun firing.
Mobility Kill	A kill that disables the vehicle movement. The crew has 20 seconds to bring the vehicle to a stop. If motion is sensed after the 20 seconds, a Cheat Kill will occur.
Near Miss	Laser fire close enough to be sensed by a laser detector, but not close enough to cause a Hit or Kill.

Table 1-2. Glossary - Continued.

Optical Turret Positioning Device (OTPD)	A device that provides an optical reference signal to the turret detector belts (on applicable vehicles) to determine the turret position with reference to the hull.
Reset	Brings the system to the ready (alive) condition. In a CVS, the reset brings the system to a ready condition and returns ammunition to the default levels.
Resurrect	When a CVS is resurrected, the system is brought to a ready condition, but the ammunition levels remain as they were when the system was killed.
Sleep Mode	When the SAT is in the rest or inactive state.
Small Arms Transmitter (SAT)	A laser transmitter used on various individual and vehicle-mounted rifles and machine guns.
Torso Harness	The part of the IWS that is worn on the upper body.
Universal Laser Transmitter (ULT)	A laser transmitter used on various combat vehicle systems mounted on the main gun and the coax machine gun.
Weapon Token	Is embedded in software and allows the IWS Console (DPCU) to enable a SAT. The Weapon Token is transmitted to the IWS when the system is reset/resurrected by the CD/TDTD. The SAT cannot be enabled without a Weapon Token and will not have one in the following conditions: system is killed or another SAT is enabled with the same Torso Harness.

NOTE

Army vehicle kits contain the SATs for the vehicle mounted weapons, but do not include IWS SATs. Marine Corps vehicle kits do not include any IWS items.

1.7 SAFETY, CARE, AND HANDLING

Before, during and after operation of equipment, read and adhere to all applicable WARNINGS and CAUTIONS. Perform all preventive maintenance checks and services as scheduled, and report any discrepancies as soon as possible. Use the proper tools and procedures for installation, troubleshooting, removal and replacement of components, and notify higher echelon maintenance personnel when warranted.

Although MILES 2000 consists of ruggedized equipment, designed to withstand extreme vibration, shock, and environmental stresses, treat the equipment with reasonable care; do not use excessive force when handling, packing, or stowing equipment. Responsible handling and use will help prolong the life cycle and appearance of the equipment.

SECTION II. EQUIPMENT DESCRIPTION AND DATA

1.8 EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.

The MILES 2000 Controller Device/Training Data Transfer Device (CD/TDTD), is a tool the Observer/Controller uses to prepare, control, and collect data from individuals and vehicles involved in an exercise.

1.8.1 Equipment Characteristics. The CD/TDTD is a tool used to define weapons systems/targets during training exercises, reset or resurrect those weapons or targets when necessary, and relay and collect all event and associated data.

1.8.2 Capabilities and Features.

- a. Combines the Controller Device (CD) and the Training Data Transfer Device (TDTD) into one portable unit.
- b. Defines weapon and target vulnerability parameters.
- c. Has reset and resurrect features.
- d. Downloads event data and associated data from the MILES 2000 Control Unit (CU), through the Kill Status Indicator (KSI), the Individual Weapons System (IWS) Console, (DPCU) or the MILES Target Interface Device (MTID) Target Console for mission accountability and records.
- e. Uses eye-safe laser transmitters.
- f. Compatible with all other MILES devices.

1.9 LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.

The MILES 2000 Controller Device/Training Data Transfer Device (CD/TDTD) combines both CD and TDTD into one portable stand-alone unit.

1.10 EQUIPMENT DATA. Table 1-3 defines the equipment data.

Table 1-3. Equipment Data.

LASER TRANSMITTER	WEIGHT (POUNDS)	DIMENSIONS L x W x D (INCHES)	OPERATING RANGE (METERS)
CD/TDTD	3.01	2.95 x 9.50 x 1.37	20-500

SECTION III. THEORY OF OPERATION

1.11 BASIC PRINCIPLES OF OPERATION.

1.11.1 Principles of Operation (MILES 2000). The MILES 2000 system uses laser beams to simulate actual weapons fire. An eye-safe invisible laser beam is sent out by each weapon's transmitter when it is fired. The laser beam is coded, and simulates all of the weapon's capabilities including range, accuracy, and destructive capability.

Laser detector systems are used to sense opposing fire. The detector systems register incoming laser beams and determine whether they have scored a Near Miss, Hit, or Kill. Incoming fire can result in more than one type of a Hit or Kill. Types of Hits or Kills include Mobility, Communications, Firepower, or a Catastrophic Kill of the entire vehicle. A Catastrophic Kill will occur from a combination of any two types of kills.

Table 1-4 defines the Kill Indication Chart.

1.11.2 Principles of Operation (CD/TDTD). The CD/TDTD is a combination Controller Device (CD) and Training Data Transfer Device (TDTD).

- a. Its CD capability allows it to transmit an encoded laser beam and provide the following from remote positions:
 - (1) Transmittal of a "Kill" or "Near Miss" to a Combat Vehicle System (CVS), Independent Target System (ITS), Crew-Served System Weapon (CSWS), Individual Weapons System (IWS), and/or MILES Target Interface Device (MTID).
 - (2) Transmittal of the optical reset code to reset a previously killed CVS, ITS, CSWS, and/or IWS.
 - (3) Transmittal of the optical resurrection code to resurrect a previously killed CVS, ITS, CSWS, and/or IWS.
 - (4) Activation/Deactivation of the Control Mode.
- b. The TDTD capability provides the following functions:
 - (1) The upload of information to the MILES 2000 Control Unit (CU), using the Kill Status Indicator (KSI), the IWS Console (DPCU) or to the MTID Target Console, to initialize it with specific information to uniquely identify its performance capabilities. It uploads weapon type(s), ammunition loads and vulnerability data commensurate with the system being defined.
 - (2) Download of all event data and associated data from the MILES 2000 CU, using the Kill Status Indicator (KSI), IWS Console (DPCU), or the MTID Target Console.

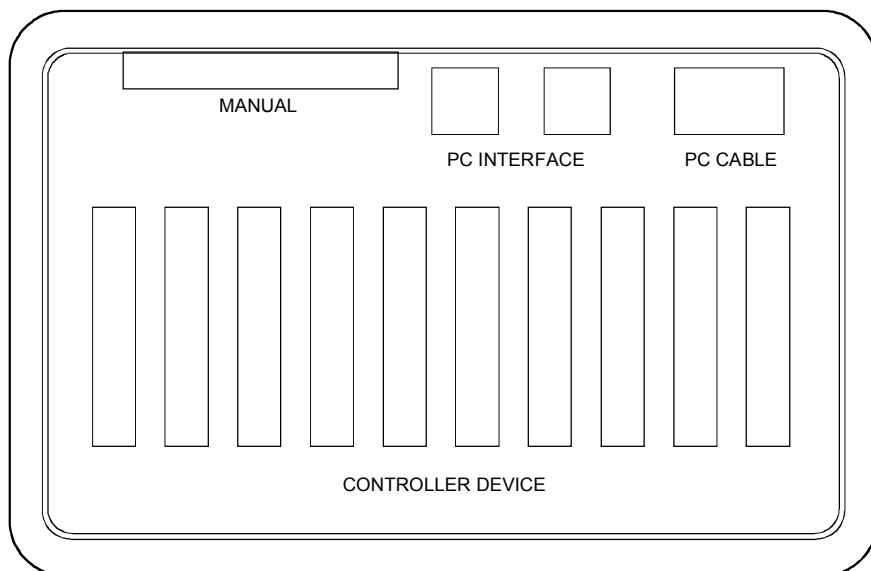
Table 1-5 defines the Kit/Equipment List.

See Figure 1-1 for CD/TDTD Transit Case.

Table 1-4. Kill Indication Chart.

Type of Hit/Kill	Number of KSI Flashes	Audible Indication
Vehicle		
SMAW Spotting Rifle	1 Flash	None
Near Miss	2 Flashes	Near Miss.
Hit	4 Flashes	Hit.
Mobility Kill	4 Flashes	Hit, Mobility. Stop Vehicle. (the crew has 20 secs to bring the vehicle to a stop)
Fire Power Kill	4 Flashes	Hit, Fire Power.
Communications Kill	4 Flashes	Hit, Commo Kill. (disables external communications only)
Catastrophic Kill	Flashes Continuously	Vehicle Kill
Administrative Kill	Flashes Continuously	Vehicle Kill
Cheat Kill	Flashes Continuously	Cheat Kill
Reset	1 Flash	Reset/Resurrect
IWS		
Near Miss	N/A	2 Beeps
Kill	N/A	Continuous
Administrative Kill	N/A	Continuous
Cheat Kill	N/A	Continuous
Reset	N/A	4 Beeps
<p>Notes: Cheat Kill will occur during a Mobility Kill if the vehicle does not stop within the allotted 20 seconds or moves after it has stopped. A Cheat Kill will occur when disconnecting any of the following pieces of vehicle equipment: KSI, any Detector Belt/Array, or Power Controller (must be reconnected for cheat to be indicated), or removing the battery on IWS Console (DPCU).</p> <p>In the event of a Catastrophic or Communications Kill, external communications can be over-ridden for EMERGENCIES ONLY by pressing the USER INFO push button on the Control Unit, selecting communication override and pressing the ENTER push button.</p>		

TD 63-6920-703-10
TM 6920-10/4



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Figure 1-1. CD/TDTD Transit Case

Table 1-5. Kit/Equipment List.

PACKAGE NOMENCLATURE: TRAINING DATA TRANSFER DEVICE				
PACKAGE PERTAINS TO: CONTROLLER DEVICE, MILES 2000				
PACKAGE CONTENTS				
QUANTITY	NAME OF ITEM	DWG NO.	PART NO.	NOTES
1	CD/TDTD ASSY	147945	147945-1	
AR	TRANSIT CASE, CD/TDTD	147391	147391-1	
AR	OPERATOR'S MANUAL		TD-63-6920-703	
AR	INTERFACE ASSY, TDTD/PC	147920	147920-2	1
<p><u>NOTES:</u></p> <p>QUANTITY OF 1 147920-2 INTERFACE ASSY FOR EVERY 5 147945-1 CD/TDTD ASSEMBLIES.</p>				

TD 63-6920-703-10
TM 6920-10/4

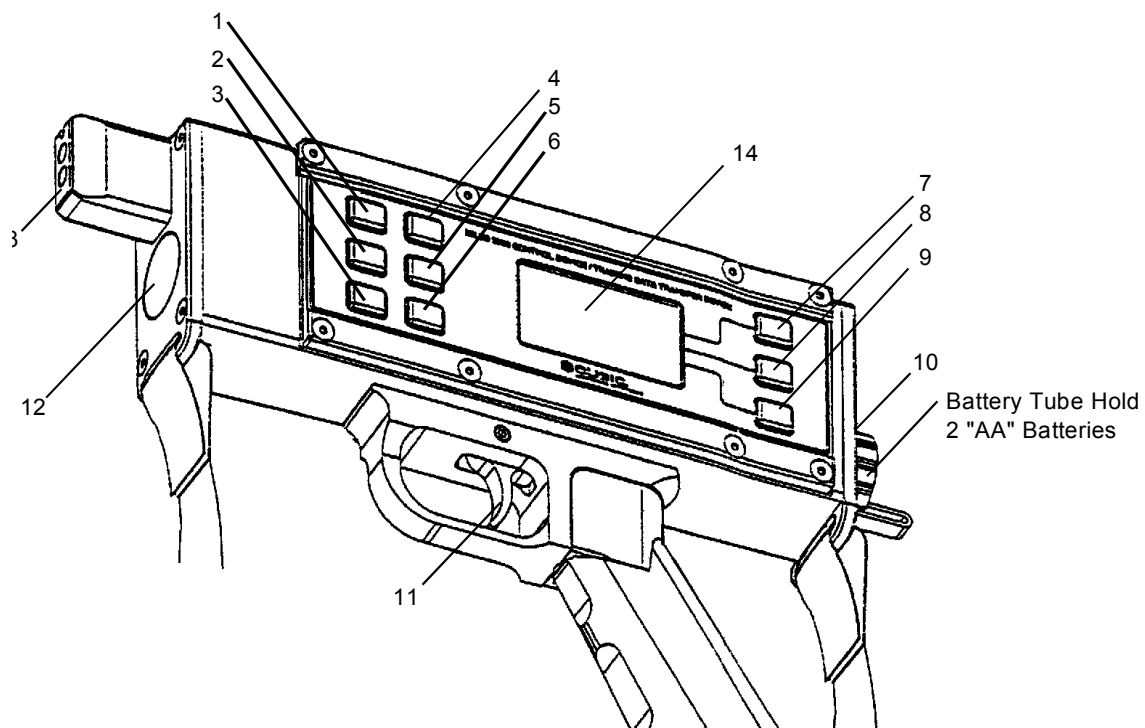
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CHAPTER 2 OPERATING INSTRUCTIONS

SECTION I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

2.1 EQUIPMENT FIGURES AND TABLES.

Figure 2-1 illustrates and describes the functions of MILES 2000 Controller Device/Training Data Transfer Device (CD/TDTD) operating controls and indicators.



1. POWER PUSH BUTTON. Turns the power on and off.
2. LIGHT PUSH BUTTON. Controls the LCD backlight for viewing the screen under low light conditions.
3. OK PUSH BUTTON. Used to confirm certain actions and will normally step back one screen.

4. RUN PUSH BUTTON. Used to access the RUN menu.
5. DATA PUSH BUTTON. Used to access the DATA menu.
6. SYS PUSH BUTTON. Used to access the SYSTEM menu.
7. SOFTKEY 1. Used as indicated in operation procedures to access and select various Controller functions.
8. SOFTKEY 2. Used as indicated in operation procedures to access and select various Controller functions.
9. SOFTKEY 3. Used as indicated in operation procedures to access and select various Controller functions.
10. LED INDICATORS. Red indicator illuminates when Built-In-Test (BIT) fails or laser is transmitting. Green flashes when BIT passes and when uploading or downloading successfully.
11. TRIGGER. Used to activate various functions when selected in the RUN, DATA, and SYSTEM menus. Activates both IR and LASER transmissions.
12. LASER/DETECTOR LENS PORT. The window through which the laser beam is transmitted or received.
13. OPTICAL PORT. This is the Infrared (IR) Port through which data is uploaded/downloaded.
14. DISPLAY WINDOW. Provides the readout for data currently selected.

SECTION II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

Preventive Maintenance Checks and Services (PMCS) will ensure that the MILES 2000 equipment will be ready for operation and perform satisfactorily throughout its mission. Preventive maintenance checks consist of performing a systematic inspection to discover defects before they result in operational failure of the equipment. Defects or malfunctions discovered by the crew during use of the MILES 2000 equipment, or as a result of performing maintenance checks and services, will be reported using the proper forms.

2.2 INTRODUCTION TO PMCS TABLE.

Operator preventive maintenance checks and services are shown in Table 2-1. Tasks to be performed before operation are checked in the "B" column under heading "Interval"; tasks to be performed during operation are checked in the "D" column; tasks to be performed after operation are checked in the "A" column; tasks to be performed weekly are checked in the "W" column; and tasks to be performed monthly are checked in the "M" column.

NOTE

Within designated interval, these checks are to be performed in the order listed.

B - Before Operation	W - Weekly
D - During Operation	M - Monthly
A - After Operation	

Table 2-1. Operator Preventive Maintenance Checks and Services

ITEM NO.	ITEM TO BE INSPECTED	INTERVAL B D A W M						PROCEDURES CHECK FOR AND HAVE REPAIRED	EQUIPMENT IS NOT READY/AVAILABLE IF:
1.	CD/TDTD	✓		✓				Inspect for cracks in display window and membrane switches.	Display window or membrane switch broken or cracked.
		✓	✓					Check for display in display window.	No display in display window.
		✓						Check for batteries in unit.	Batteries not present.

SECTION III. OPERATION UNDER USUAL CONDITIONS

2.3 ASSEMBLY AND PREPARATION FOR USE.

2.3.1 Installation Procedures. The CD/TDTD is preassembled. No installation is required.

2.4 INITIAL ADJUSTMENTS BEFORE USE, DAILY CHECKS, AND SELF-TEST REQUIREMENTS.

Before operating the CD/TDTD, perform the following:

- a. Ensure Preventive Maintenance Checks and Services (PMCS) described in Section II have been performed.
- b. Insert two **NEW** AA (1.5 Vdc) batteries in the unit by performing the following instructions:
 - (1) On the back of the CD/TDTD, press the battery cap in slightly, then rotate it in a counterclockwise direction.
 - (2) Insert batteries with the positive end first. (There is a pictorial display of battery installation on the bottom of the unit.)
 - (3) Replace the battery cap by simultaneously pressing it in and rotating it clockwise.
- c. Perform the Functional Checks described in Section V.

2.5 OPERATING PROCEDURES.

NOTE

See Figure 2-4, CD/TDTD Operating Flowchart, following paragraph .5.10.2.

2.5.1 Setting Time/Date in System Mode.

- a. Press the SYS push button to access the system menu.
- b. Press softkey 1; screen will display "Time Menu."
- c. Press softkey 1 again, "Set Time/Date."
- d. Screen will display "Time: (H:M:S)" with "Date: (M/D/Y)" underneath.
- e. Use softkey 2 to move the cursor () to the right. (The cursor will not move to the left.) Use softkey 1 to increase and softkey 3 to decrease the numbers. Press the "OK" push button to save the time/date setting or press the "DATA," "RUN," or "SYS" push button to quit without saving the new setting

2.5.2 Performing Built-In-Test (BIT). The CD/TDTD will automatically run BIT, if the batteries are left out of the unit for three (3) minutes, upon power up after installation of the batteries. If the batteries have not been removed, the CD/TDTD will not automatically perform a BIT upon power-

up. Prior to operation of the equipment, it is important to initiate this test by performing the following instructions:

- a. Press the SYS push button to access the system menu.
- b. Press softkey 3 to run the BIT.
- c. During the test, the second line from the bottom of the display will prompt you to press specific switches (switch test). Press each as prompted; if there are no errors, the BIT will continue to run and display results on the screen. If a low battery is detected, the screen will display this and will not prompt for the switch test. At the bottom of the screen, the message "TR = Ignore" will be displayed. Pulling the trigger of the CD/TDTD will, in some cases, allow you to continue with operations even though the battery is low.

NOTE

If CD/TDTD is in sleep mode (blank screen), pulling the trigger or pressing the POWER push button will bring the CD/TDTD back to life.

2.5.3 Uploading Setup Information from MILES After-Action Review System (MARS). (See Figures 2-2 and 2-3.)

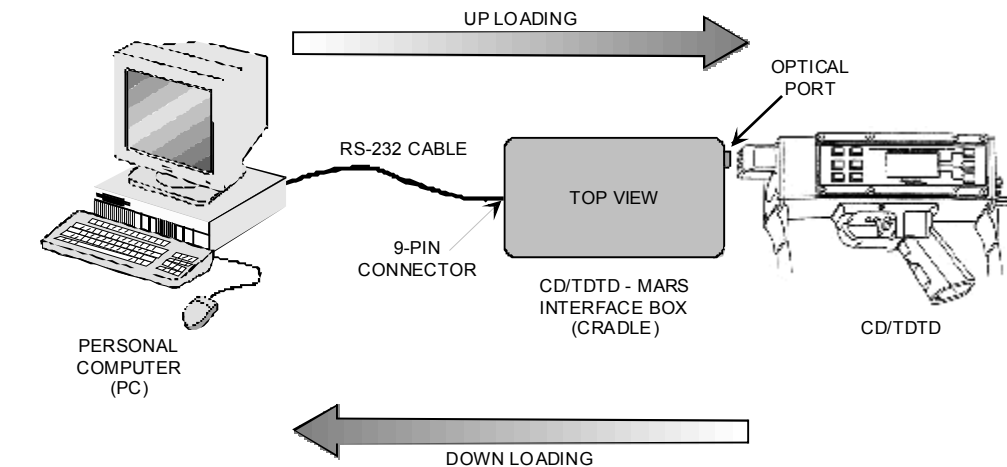


Figure 2-2. Uploading/Downloading Configuration

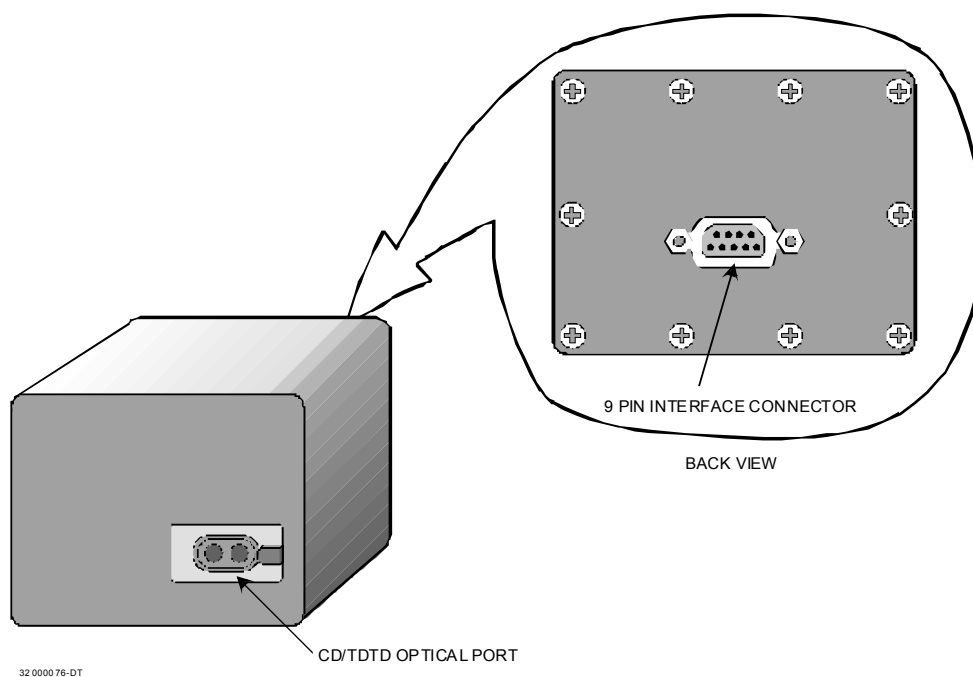


Figure 2-3. CD/TDTD – MARS Interface Box (Cradle).

- a. After setting up the appropriate configuration information using the MARS, press the DATA push button to access the Data menu. Press softkey 1, “Link DPCU/PC.”
- b. Press softkey 2, “Upload/(Program).”
- c. Press softkey 2 again, “Upload from PC.”
- d. The CD/TDTD screen will display “Place in MARS cradle waiting for PC . . .” Follow the directions or press softkey 3 to exit. Ensure the Optical Port of the CD/TDTD is in full contact with the Optical Port of the CD/TDTD - MARS Interface Box (Cradle).
- e. Initiate transfer process from the PC.
- f. The CD/TDTD will emit a short beep when the transfer operation is completed successfully. (If the transfer is unsuccessful, the CD/TDTD will emit a long beep; this is true for all CD/TDTD transfer operations.) Once the CD/TDTD indicates that transfer operation is complete, press softkey 3 to exit.

2.5.4 Uploading Setup Information from CD/TDTD to CVS, IWS, Surrogate Weapons, and Target Systems.

2.5.4.1 Uploading Setup Information from CD/TDTD to CVS and IWS.

- a. Press the Data push button to access the Data menu.
- b. Press softkey 1, "Link DPCU/PC."
- c. Press softkey 2, "Upload."
- d. Press softkey 1, "Upload to DPCU."
- e. Connect the Optical Port of the CD/TDTD to the Optical Port of the Kill Status Indicator (KSI) for the CVS or to the Optical Port on the IWS Console (DPCU).
- f. Pull trigger on the CD/TDTD. The LED on the rear of the CD/TDTD will flash green. The CD/TDTD will emit a short beep if transfer is successful.

2.5.4.2 Uploading Setup Information from CD/TDTD to Surrogate Weapons.

- a. Press the Data push button to access the Data menu.
- b. Press softkey 3, "Surrogate Setup." The next screen will show three (3) selections: "WESS Mode," "SMAW," and "AT4."
- c. WESS Mode setup: press softkey 1, "WESS Mode." This will toggle between ATWESS/DRY. Make the appropriate selection.
- d. SMAW setup:

- (1) Press softkey 2, "SET SMAW" menu will appear and the screen will display:

Bunker Buster
Anti Armor
Spotting (for the spotting rifle)
Reload (This is only for the spotting rifle.)

- (2) Choose softkey 1 to increase the number of rounds for each choice.
- (3) Choose softkey 3 to decrease the number of rounds for each choice.
- (4) Choose softkey 2 to move the cursor to the next selection.
- (5) Connect the CD/TDTD to the Optical Port on the SMAW and pull the trigger to transfer the information. The LED on the rear of the CD/TDTD will flash green. The CD/TDTD should emit a short beep to indicate successful data transfer.

e. AT4 setup:

- (1) Press softkey 3, "SET AT4" menu will appear and the screen will display:

Rounds
Reload

- (2) Choose softkey 1 to increase the number of rounds for each choice.
- (3) Choose softkey 3 to decrease the number of rounds for each choice.
- (4) Choose softkey 2 to move the cursor to the next selection.
- (5) Connect the CD/TDTD to the Optical Port on the AT4 and pull the trigger to transfer the information. The LED on the rear of the CD/TDTD will flash green. The CD/TDTD should emit a short beep to indicate successful transfer.

2.5.4.3 Uploading Setup Information from CD/TDTD to MILES Target Interface Device.

- a. Press the Data push button to access the Data menu.
- b. Press softkey 1, "Link DPCU/PC."
- c. Press softkey 2, "Upload."
- d. Press softkey 1, "Upload to DPCU."
- e. Place the Optical Port of the CD/TDTD into the Optical Port on the side of the MTID Target Console. Pull the trigger on the CD/TDTD to upload the preset information. The LED on the rear of the CD/TDTD will flash green and should emit a short beep to indicate successful data transfer.

2.5.5 Modifying Player Identification (PID).

2.5.5.1 Modifying PID for Individual Player.

- a. On the CD/TDTD, press the DATA push button, then softkey 1, "Link DPCU/PC."
- b. Press softkey 3, "Modify Manworn PID."
- c. Screen will display "Manworn PID;" use softkey 1 to increase and softkey 3 to decrease the number at that position. Use softkey 2 to move the cursor to the next position to the right.
- d. Connect the Optical Port on the CD/TDTD to the Optical Port on the IWS Console (DPCU); pull trigger. The LED on the rear of the CD/TDTD will flash green. The CD/TDTD should emit a short beep to indicate successful data transfer.
- e. Upon successful transfer of the PID, the CD/TDTD will increment to the next valid PID automatically. This makes changing PIDs for large groups of individuals easier.

2.5.5.2 Modifying PID for Vehicle.

- a. On CD/TDTD, press the DATA push button, then softkey 1, “Link DPCU/PC.”
- b. Press softkey 2, “Upload.”
- c. Press softkey 3, “Select/Modify PID.” Press softkey 2 to modify.
- d. On the “Modify PID” screen, select softkey 1 to bring up the “Vehicle PID” screen.
- e. Use softkey 1 to increase and softkey 3 to decrease the number at that position. Use softkey 2 to move the cursor to the next position to the right.
- f. Connect the Optical Port on the CD/TDTD to the Optical Port on the KSI. Ensure the CD/TDTD is flush with the Optical Port of the receiving unit; pull the trigger. The LED on the rear of the CD/TDTD will flash green. The CD/TDTD should emit a short beep to indicate successful data transfer. Press “OK.”
- g. Press softkey 3 to exit.

2.5.6 Downloading Events.

NOTE

DO NOT download under “LBAT” conditions.

When downloading with “No Clear” selected, the number of outgoing messages correspond to the number of IWS Consoles (DPCU) downloaded. With “Clear” selected, the number of outgoing messages will be twice the number of IWS Consoles (DPCU) downloaded.

2.5.6.1 Downloading Events from IWS Console (DPCU).

- a. On the CD/TDTD, press the DATA push button, then softkey 1, “Link DPCU/PC.”
- b. Press softkey 1 again, “Download/(Events).”
- c. Press softkey 1 for a third time, “Download from DPCU.”
- d. Select “Clear” or “No Clear,” using softkey 1 to toggle, depending upon whether or not you want to clear the events information from the IWS Console (DPCU).
- e. Connect the Optical Port on the CD/TDTD to the Optical Port on the IWS Console (DPCU); pull the trigger. The LED on the rear of the CD/TDTD will flash green. The CD/TDTD should emit a short beep to indicate successful data transfer.

NOTE

The number of systems downloaded and the percentage of memory left in the CD/TDTD is displayed. As more systems are downloaded, the number of systems downloaded should increase and the percentage of memory remaining should decrease.

CD/TDTD fails to download. This condition is a result of a “full buffer” in the CD/TDTD. The gun will not download and will be followed with 3 consecutive beeps indicating something is not operating properly.

To correct this immediate problem, press the OK function button. This will return the user to the main menu. Once at the main menu, go back to the download IWS Console (DPCU) menu and again attempt to download.

- f. Verify download in IWS Console (DPCU) events menu.

2.5.6.2 Downloading Events from Vehicles.

- a. On the CD/TDTD, press the DATA push button, then softkey 1, “Link DPCU/PC.”
- b. Press softkey 1 again, “Download/(Events).”
- c. Press softkey 1 for a third time, “Download from DPCU.”
- d. Select “Clear” or “No Clear,” using softkey 1 to toggle depending upon whether or not you want to clear the events information. Pressing softkey 1 will toggle between the two choices.
- e. Connect the Optical Port on the CD/TDTD to the Optical Port on the KSI; pull the trigger until the CD/TDTD emits a short beep. The LED on the rear of the CD/TDTD will flash green. Look in the lower right hand corner of the display.
- f. Verify download on CU events list.

2.5.6.3 Downloading Events from Surrogate Weapons.

- a. On the CD/TDTD, press the DATA push button, then softkey 1, “Link DPCU/PC.”
- b. Press softkey 1, “Download/(Events).”
- c. Press softkey 1 for a third time, “Download from DPCU.”
- d. Select “Clear” or “No Clear,” depending upon whether or not you want to clear the events information from the Surrogate Weapon.
- e. Connect the Optical Port on the CD/TDTD to the Optical Port on the Surrogate Weapon; pull the trigger. The LED on the rear of the CD/TDTD will flash green. The CD/TDTD should emit a short beep to indicate successful data transfer.

2.5.6.4 Downloading Events to the MARS PC. (See Figure 2-2 and 2-3.)

- a. Prepare the MARS PC to receive data from the CD/TDTD.
- b. On the CD/TDTD, press the DATA push button, then softkey 1, “Link DPCU/PC.”

- c. Press softkey 1, “Download/(Events).”
- d. Press softkey 2, “Download to PC.”
- e. Connect the Optical Port of the CD/TDTD to the Optical Port of the CD/TDTD - MARS Interface Box (Cradle) and pull the trigger. The LED on the rear of the CD/TDTD will flash green. The CD/TDTD should emit a short beep to indicate successful data transfer.

2.5.7 Clearing Events from CD/TDTD Memory. As noted above, events may be cleared from the MILES 2000 equipment as they are being downloaded to the CD/TDTD. It is also possible to clear the downloaded events in the CD/TDTD at any given time by performing the following actions:

- a. On the CD/TDTD, press the SYS push button.
- b. Press softkey 2, “Clear Events.” The screen will display a statement that all events data will be erased followed by a “Continue?” prompt. Select “Yes” to continue. (If you select “No,” the display will return to the previous menu.)
- c. The LED on the rear of the CD/TDTD will flash green. The CD/TDTD should emit a short beep to indicate that clearance of the data was successful. The right corner of the display should show “0/100%.”

2.5.8 Resetting/Resurrecting Individual Players and Vehicles. The CD/TDTD is capable of either resetting or resurrecting an individual player or vehicle. The Reset capability should be used when the equipment is turned on initially, as the default display for the IWS Console (DPCU), the CU, and the SWS screens initialize with the status “Killed.” Reset should also be used whenever the Controller wishes to bring the individual player or vehicle from a “killed” to an active status, and wants to reset ammunition levels to default. Reset/Resurrect will give the IWS Console (DPCU) a “Weapon Token,” which allows a SAT to be activated.

NOTE

The Resurrect capability should be used when the controller wishes to bring an individual player or vehicle from a “killed” to an active status and maintain the existing ammunition levels.

2.5.8.1 Resetting Individual Players and Vehicles.

- a. Press the RUN push button, and toggle softkey 3 to “Reset/Resurrect.”
- b. Aim the CD/TDTD at a vehicle or player detector; pull the trigger, it is not necessary to make connection with the Optical Port for the target.
- c. The LED on the rear of the CD/TDTD will flash red. The CD/TDTD should emit a short beep to indicate a successful transmission of reset code.
- d. The IWS Console (DPCU), SWS display, or the CU should indicate a ready status.

2.5.8.2 Resurrecting Individual Players and Vehicles.

- a. Press the RUN push button, and toggle softkey 3 to “Reset/Resurrect.”
- b. Aim the CD/TDTD at a vehicle or manworn detector; pull the trigger.
- c. The LED on the rear of the CD/TDTD will flash red. The CD/TDTD should emit a short beep to indicate a successful transmission of resurrect code.
- d. The IWS Console (DPCU), SWS display, or the CU should indicate a ready status.

2.5.8.3 Killing Individuals and Vehicles.

- a. Press the RUN push button, and toggle softkey 1 to “Man Kill/Universal Kill.”
- b. Aim the CD/TDTD at a detector and pull the trigger.
- c. The LED on the rear of the CD/TDTD should flash red. The CD/TDTD will emit a short beep to indicate successful transmission of the Kill Code.
- d. The IWS Console (DPCU) will beep continuously and the display will read “KILLED.” On the vehicle systems, the KSI will flash continuously and the CU will read “KILLED.”

2.5.8.4 Setting IWS and CVS into Control Mode.

- a. Press the RUN push button and toggle softkey 2 to “Control Mode.”
- b. Aim the CD/TDTD at a detector and pull the trigger.
- c. The LED on the rear of the CD/TDTD will flash red. The CD/TDTD will emit a short beep to indicate successful transmission of the Control Mode code.
- d. The IWS Console (DPCU) or the CU will read “CONTROL MODE ON.”
- e. Control Mode can be exited by toggling softkey 2 to “CONTROL MODE OFF.”
- f. Aim the CD/TDTD at a detector and pull the trigger.

2.5.9 Testing Procedures.

2.5.9.1 Testing the IWS.

- a. On the CD/TDTD, press the RUN push button to access the Run menu.
- b. Press softkey 1 and select “Man Kill.”
- c. Aim the CD/TDTD at a MILES 2000/equipped individual player; pull the trigger. The LED on the rear of the CD/TDTD will flash red.

- d. The IWS should emit a continuous beep, indicating a “kill,” and the IWS Console (DPCU) should display “MACHINE GUN.” (Machine Gun is the default weapon for an Admin Kill.)
- e. Reset the IWS.
- f. On the CD/TDTD, press the RUN push button again and press softkey 2. Select “Near Miss.”
- g. Aim the CD/TDTD at a MILES 2000/equipped individual player; pull the trigger. The LED on the rear of the CD/TDTD will flash red.
- h. The IWS should emit two (2) beeps to indicate a “Near Miss,” and the IWS Console (DPCU) should display “Near Miss.”
- i. Ensure all detectors are functional by repeating steps g. and h. above for all detectors.

2.5.9.2 Testing the Vehicle MILES 2000 System.

- a. On the CD/TDTD, press the RUN push button to access the Run menu.
- b. Press softkey 1 and select “UNIV Kill.”
- c. Aim the CD/TDTD at a MILES 2000/equipped vehicle; pull the trigger. The LED on the rear of the CD/TDTD will flash red.
- d. The KSI should flash continuously, indicating a “kill,” and the vehicle speaker should sound with “Vehicle Kill.”
- e. Select softkey 3, “Reset” on the CD/TDTD, and reset the CVS.
- f. Toggle softkey 2 and select “Near Miss.”

NOTE

A “Near Miss” does not require resetting.

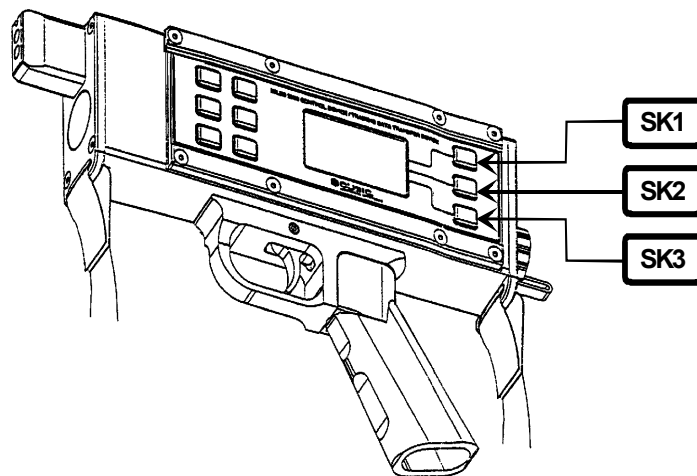
- g. Aim the CD/TDTD at a MILES 2000/equipped individual player; pull the trigger. The LED on the rear of the CD/TDTD will flash red.
- h. The KSI should flash twice to indicate a “Near Miss,” and the vehicle CU should display “Near Miss.” The vehicle speaker should sound with “Near Miss.”

2.5.9.3 Selecting Specific Weapons to Test the Vehicle MILES 2000 System.

- a. On the CD/TDTD, press the DATA push button to access the Data menu.
- b. Press softkey 2, “Detect/TX Code.”
- c. Press softkey 2 again, “Set/TX Laser Code.” A list of weapons should appear on the display.

TD 63-6920-703-10
TM 6920-10/4

- d. Use softkey 1 to scroll up and softkey 3 to scroll down the list of weapons. Use softkey 2 to input your Controller PID. (This is useful when reviewing the events, as it indicates that this event was Controller-generated.) You may also use the applicable codes to test for a “hit” (which occurs when the shot is good, but the weapon is inadequate to kill the vehicle).
- e. Fire at the vehicle as indicated above. The KSI should flash in a manner appropriate to the type of hit or kill. (Refer to Table 1-4.)



RUN MODE

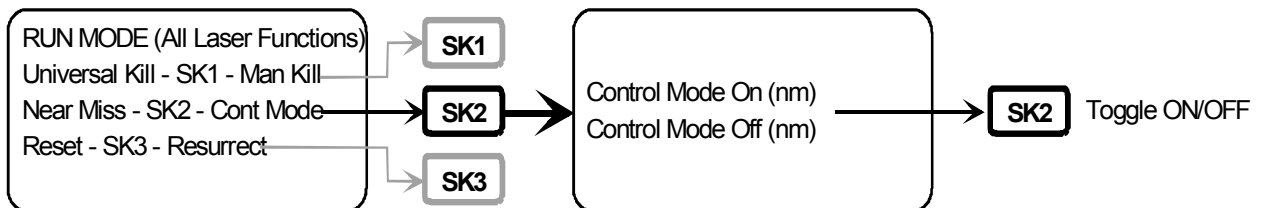


Figure 2-4. CD/TDTD Operating Flowchart (Sheet 1 of 8).

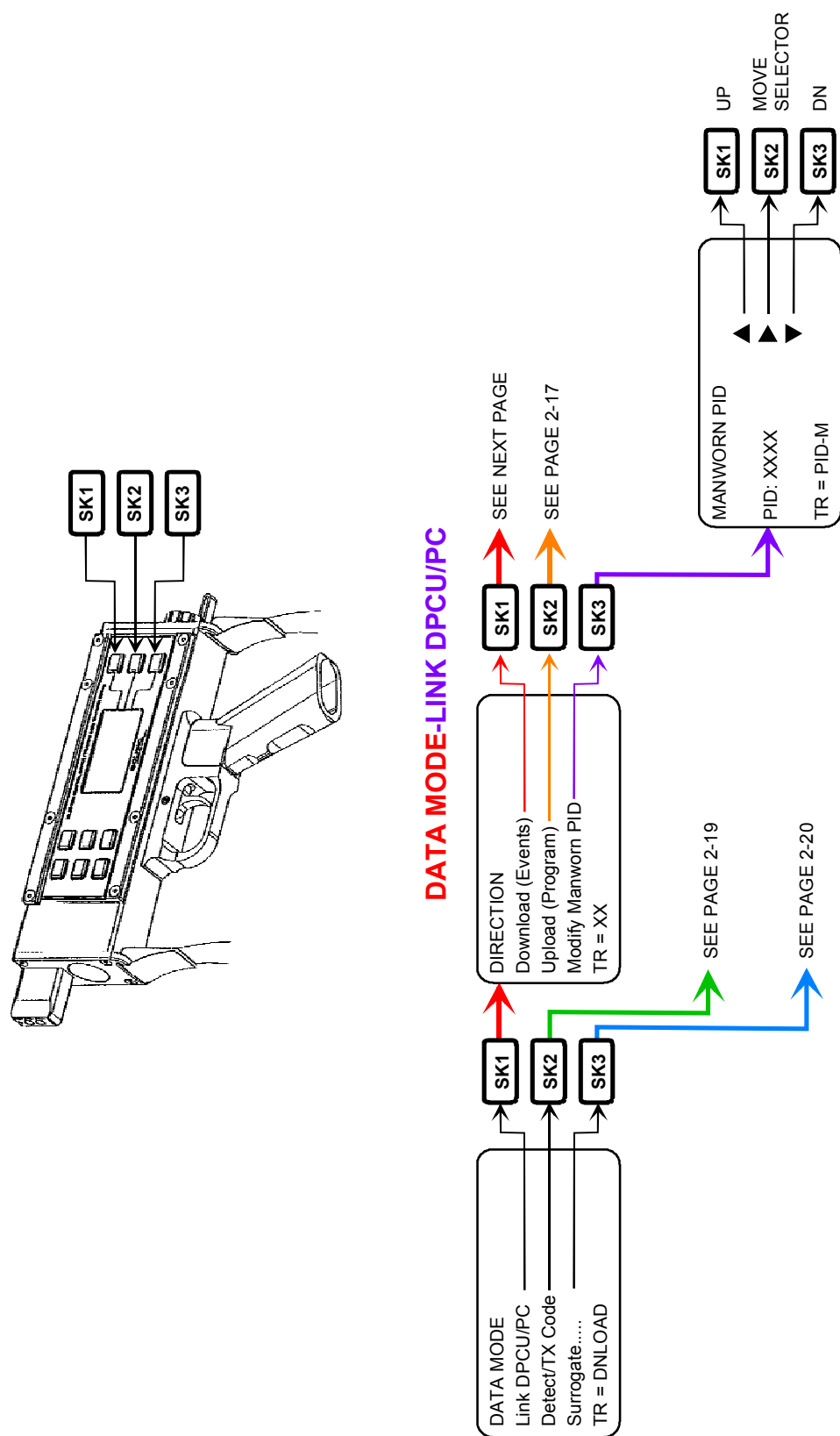
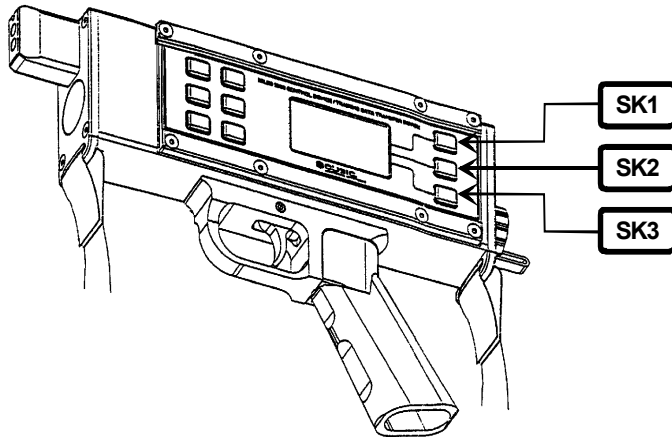
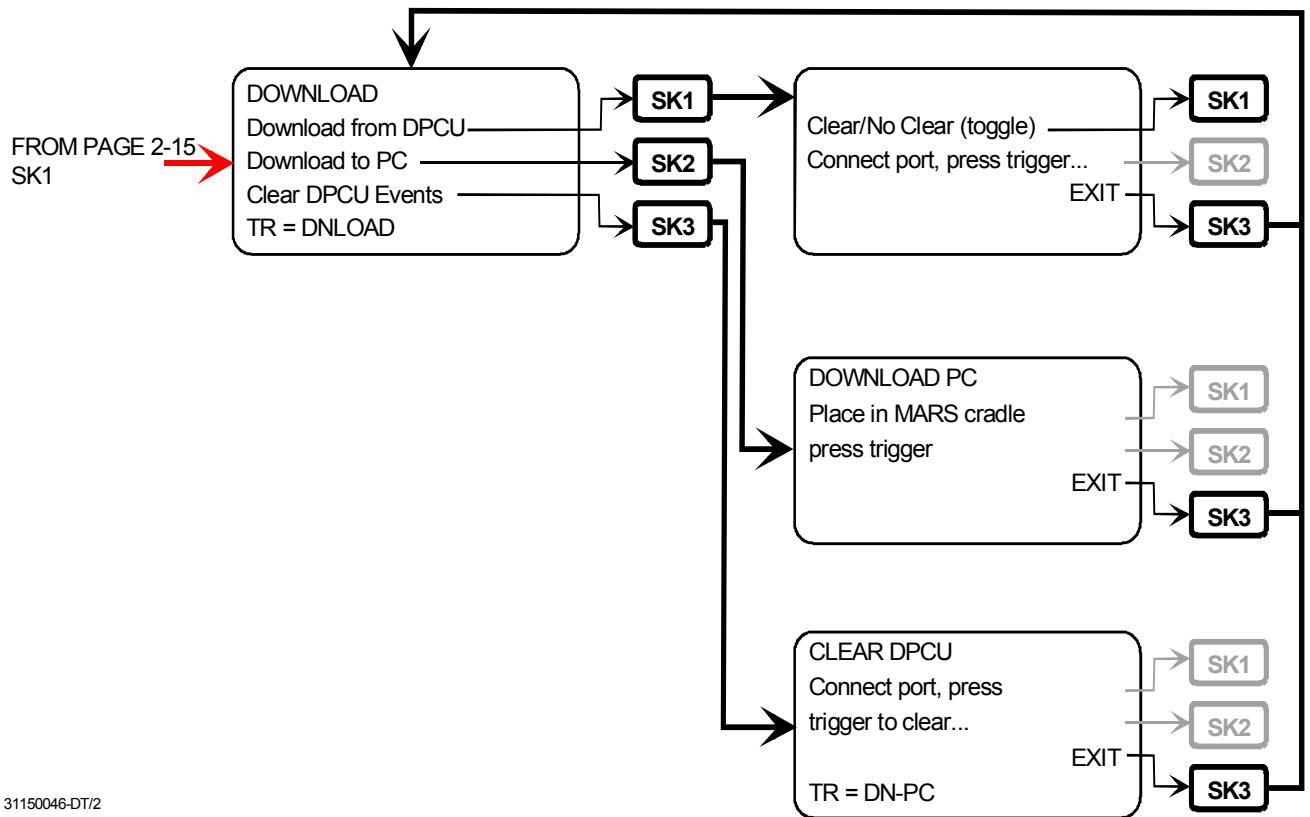


Figure 2-4. CD/TDTD Operating Flowchart (Sheet 2 of 8).

TD 63-6920-703-10
TM 6920-10/4



DATA MODE-LINK DPCU/PC (Cont'd)



31150046-DT/2

Figure 2-4. CD/TDTD Operating Flowchart (Sheet 3 of 8).

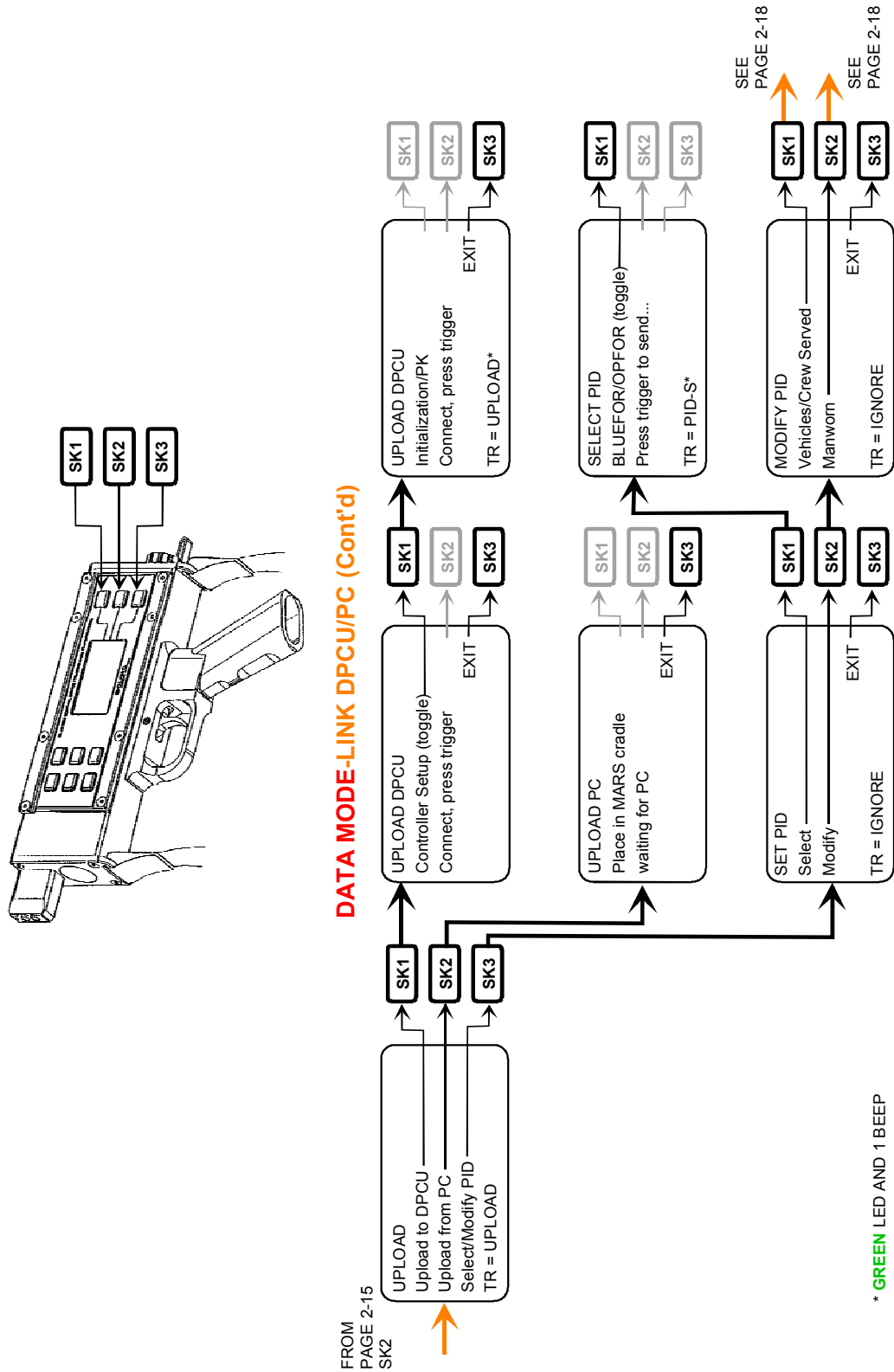
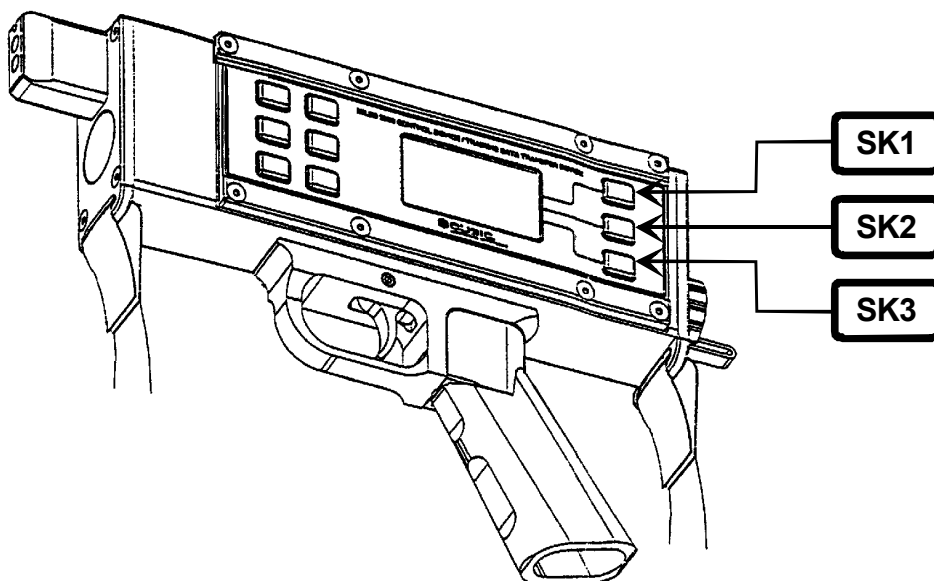


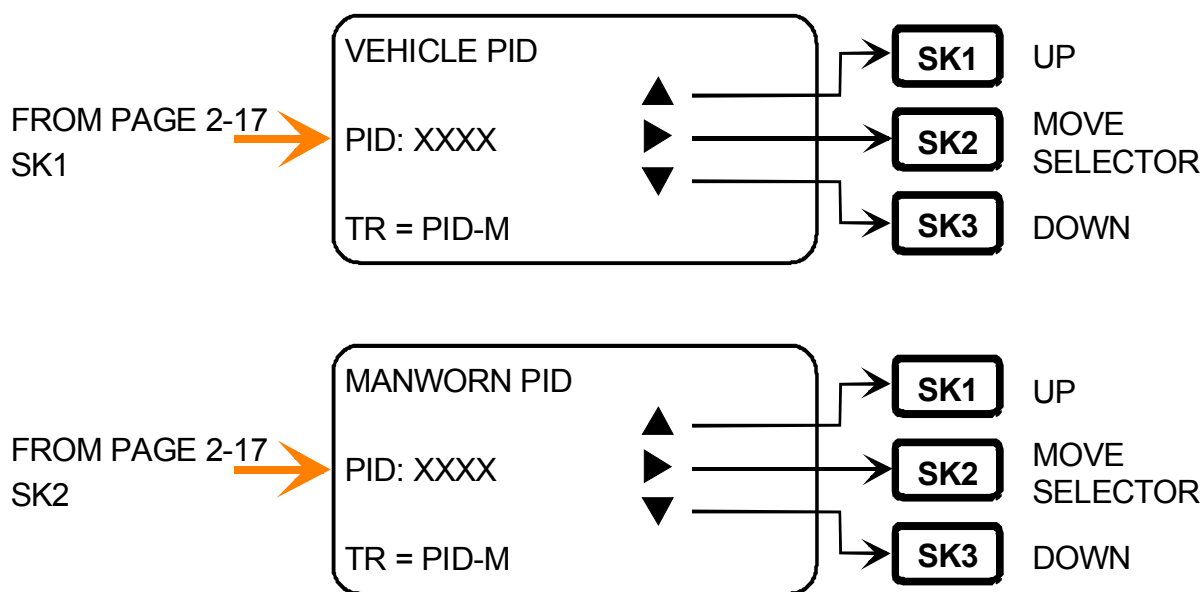
Figure 2-4. CD/TDTD Operating Flowchart (Sheet 4 of 8).

TD 63-6920-703-10
TM 6920-10/4

TD 63-6920-703-10
TM 6920-10/4



DATA MODE-LINK DPCU/PC (Cont'd)



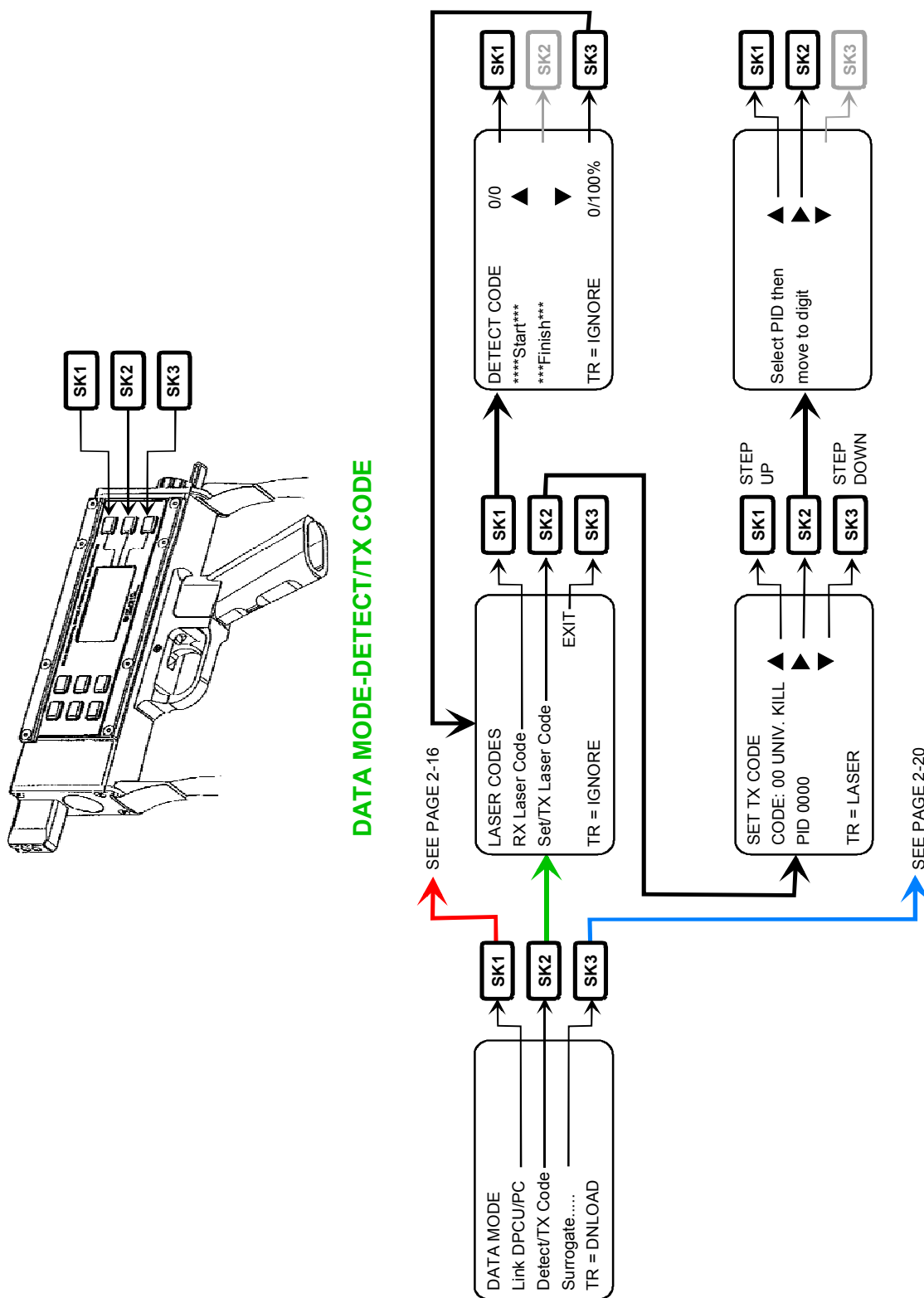
BOTH ACTIONS RESULT IN A **GREEN** LED AND 1 BEEP.
TO EXIT, PRESS SK3.

31150048-DT/2

Figure 2-4. CD/TDTD Operating Flowchart (Sheet 5 of 8).

TD 63-6920-703-10
TM 6920-10/4

TD 63-6920-703-10
TM 6920-10/4



31150049-DT/2

Figure 2-4. CD/TDTD Operating Flowchart (Sheet 6 of 8).

TD 63-6920-703-10
TM 6920-10/4

TD 63-6920-703-10
TM 6920-10/4

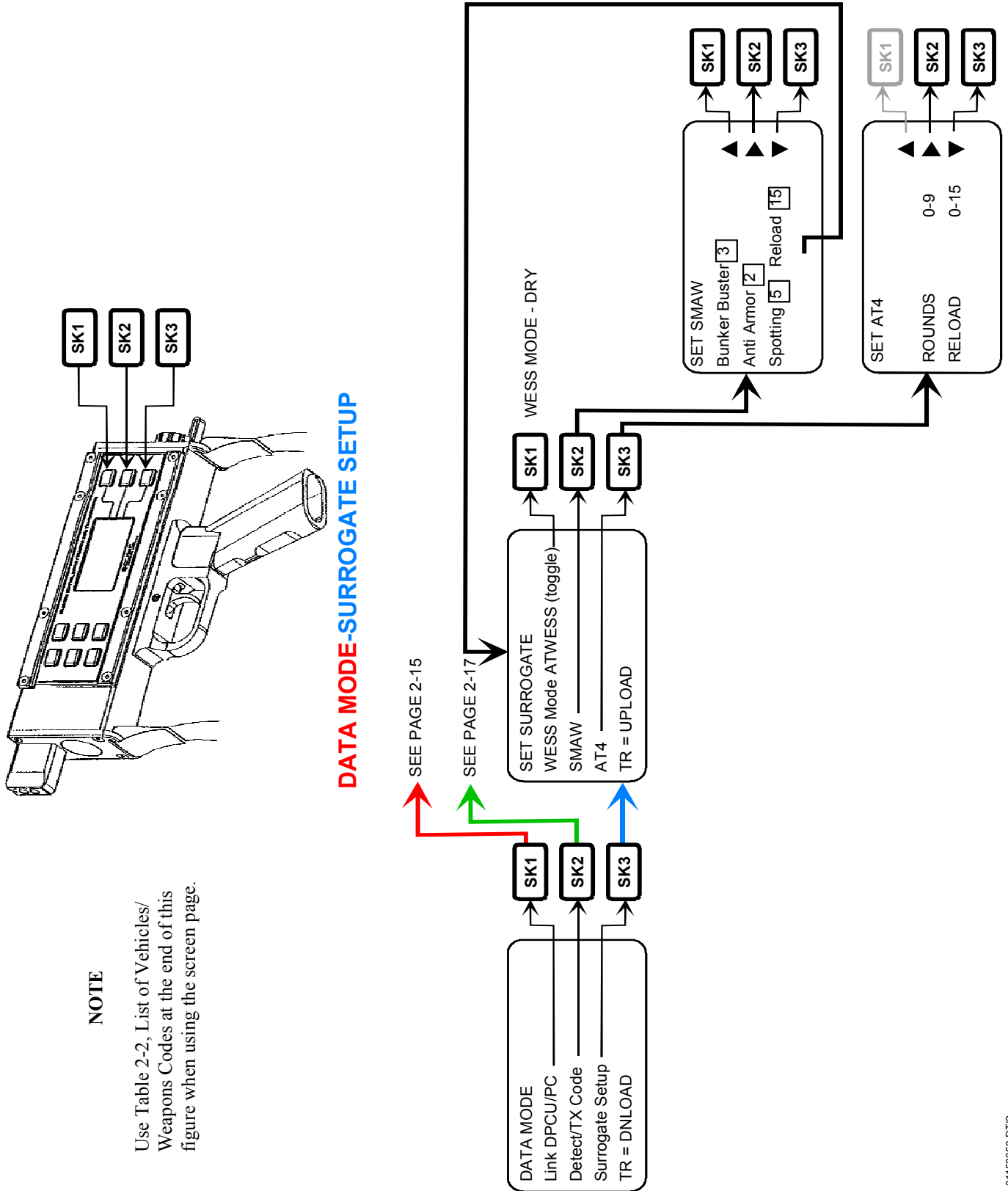
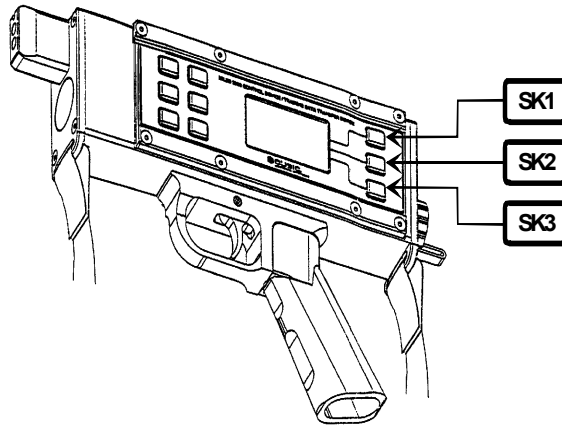
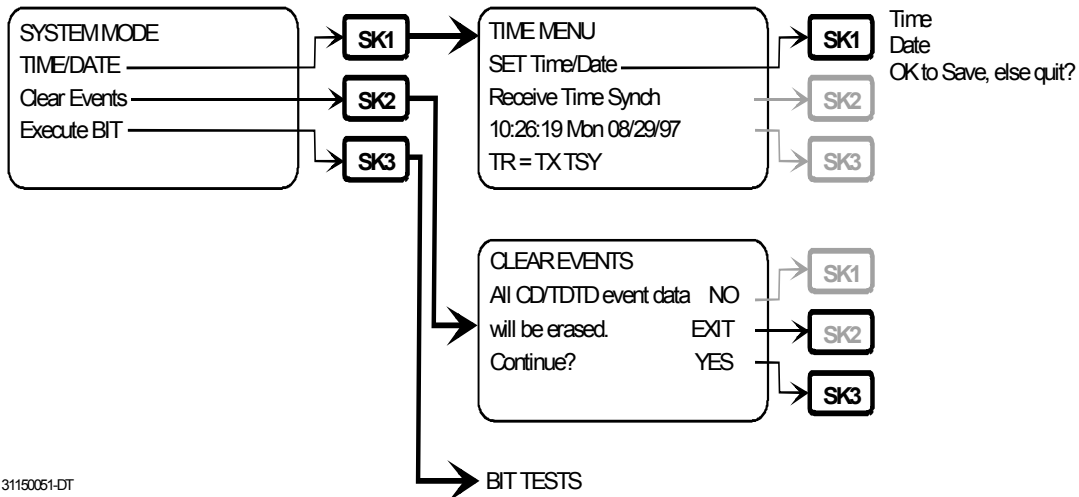


Figure 2-4. CD/TDTD Operating Flowchart (Sheet 7 of 8).



SYSTEM MODE



31150051-DT

Figure 2-4. CD/TDTD Operating Flowchart (Sheet 8 of 8).

2.5.10 Time Synchronization.

2.5.10.1 Time Synchronizing Units. After the systems have been reset, use the CD/TDTD to set the system time and date.

- a. Press the SYS push button and softkey 1.
- b. Verify the CD/TDTD has the right time and date. If not, refer to paragraph 2.5.1 to set the correct time/date.
- c. Aim the CD/TDTD at a detector and pull the trigger.
- d. The CU will display current time and date after the CD/TDTD is fired. This can be verified in the events menu.

2.5.10.2 Time Synchronizing CD/TDTDs. The CD/TDTD can be synchronized to another CD/TDTD using the following procedure.

- a. On the CD/TDTD to be synchronized, press the SYS push button.
- b. Press softkey 1, "TIME/DATE."
- c. Press softkey 2, "Receive Time Synch."
- d. On the CD/TDTD being used to synchronize, press the SYS push button followed by softkey 1.
- e. Place the CD/TDTDs six (6) inches apart with the laser lens ports facing each other.
- f. Pull the trigger of the synchronizing CD/TDTD.
- g. Both units will beep; at this time both CD/TDTDs are synchronized.

TD 63-6920-703-10
TM 6920-10/4

Table 2-2. List of MILES Vehicles/Weapons Codes

Universal Kill (Admin)	00	Grenade	19
Maverick	01	SMAW	20
Hellfire	02	30 MM	21
Sagger	03	25 MM	22
Mortar	04	20 MM Chain	23
Mine	05	Machine Gun	24
Weapon X	06	Chaparral	25
TOW	07	Stinger	26
Dragon	08	Small Arms	27
Javelin	09	Heavy WPN Near Miss	28
M21 Antitank	10	Light WPN Near Miss	29
Claymore	11	Resurrect	30
105 MM	12	Spare	31
152 MM	13	IFS	32
2.75 Rocket	14	SA-14**	33
AT4	15	ZSU-23/4 RAD **	34
120 MM	16	Utility	35
90 MM	17	Reset	36
Artillery	18	** Denotes Russian WPN	

SECTION IV. OPERATION UNDER UNUSUAL CONDITIONS

2.6 ASSEMBLY AND PREPARATION FOR USE UNDER UNUSUAL CONDITIONS.

2.6.1 Unusual Environment/Weather. MILES 2000 equipment is ruggedized to withstand extreme changes in temperature, terrain, and environment. Therefore, assembly and preparation in unusual environment/weather should only require the caution necessary to ensure the safety of the operators and other participants.

2.6.2 Fording and Swimming. MILES 2000 equipment is waterproof and ruggedized. Therefore, equipment transport which requires fording and/or swimming should only require caution necessary to safeguard operators and participants, and to maintain control and accountability of the equipment.

2.6.3 Emergency Procedures. MILES 2000 equipment requires no additional procedures for emergency situations, as the equipment has been developed to be used for training simulations encompassing a great variety of conditions and levels of threat.

SECTION V. FUNCTIONAL CHECKS

2.7 FUNCTIONAL TEST PROCEDURES

The functional check for MILES 2000 equipment is accomplished by the Built-In-Test (BIT) performed by the Controller Device/Training Data Transfer Device (CD/TDTD). It will run the BIT, and the display screen will stay lighted during the test. Once the test has been run, the CD/TDTD will display the results on the screen. Table 3-1 in Chapter 3, Section I, Troubleshooting, contains the list of possible error messages the CD/TDTD may display with MILES 2000 equipment.

2.7.1 Built-In-Test (BIT). Upon power-on, the CD/TDTD will perform BIT (Table 2-3). During operation, pressing and holding the display button until there are two lighted dots on the display will cause a BIT to be run. If there are no problems, the display will indicate "PASS" upon completion of the BIT. Insufficient power will be indicated with the code "LBAT."

Table 2-3. Built-In-Test (BIT)

ACTION	INDICATION
Turn Controller Device/Training Data Transfer Device (CD/TDTD) ON by pressing the POWER push button.	Display should light and stay lighted throughout the test.
"SWITCH TEST" will be displayed.	CD/TDTD will automatically begin the BIT. Any BIT failure will halt further operation. User may now test the CD/TDTD ensuring that the push buttons are working properly. The display should match the label of the push button being pressed.
Press the "OK" push button to enable the CD/TDTD to complete BIT. BIT results.	BIT will continue. Any BIT failure will halt further operation. "PASS" indicates CD/TDTD is ready for operation.
	"FAIL" indicates a problem. Refer to Chapter 3, Section I, Table 3-1.

TD 63-6920-703-10
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CHAPTER 3 OPERATOR MAINTENANCE INSTRUCTIONS

SECTION I. TROUBLESHOOTING

3.1 TROUBLESHOOTING PROCEDURES.

Following are troubleshooting procedures for problems which may be encountered with MILES 2000 Controller Device/Training Data Transfer Device (CD/TDTD) operation. Operator troubleshooting procedures involve identifying a problem and isolating the problem to the most likely part of the equipment. Generally the BIT run by the CD/TDTD identifies most problems and produces an error message to let the user know that there is a problem. Operator troubleshooting is neither extensive nor difficult. In most cases, the recommended action will be to turn in the defective CD/TDTD for repair, and replace it with a working unit. Table 3-1 lists problems that may be encountered, as well as possible solutions.

You may encounter equipment problems not addressed in this section. If this is the case, notify the appropriate personnel (a supervisor and/or higher echelon maintenance personnel) as soon as possible.

Table 3-1. MILES 2000 Troubleshooting Chart for CD/TDTD

INDICATION	POSSIBLE/PROBABLE CAUSE	ACTION
“LBAT” on display after BIT “LBAT” displayed after retest	Batteries low CD/TDTD malfunction	Replace batteries; retest. Replace CD/TDTD.
Any BIT Failure CD/TDTD fails to download	Various Full buffer in CD/TDTD	Replace CD/TDTD. Press OK; repeat download procedures.

SECTION II. OPERATOR MAINTENANCE

3.2 OPERATOR MAINTENANCE PROCEDURES.

Much of the operator maintenance for the MILES 2000 equipment consists of removing the defective item and replacing it with functioning equipment. Remove/Replacement procedures for the Controller Device/Training Data Transfer Device (CD/TDTD) are listed below.

3.2.1 CD/TDTD Removal.

- a. Remove the batteries from the CD/TDTD by pressing the battery cap in slightly while rotating the cap in a counterclockwise direction.
- b. After removing the battery, replace the cap by simultaneously pressing it in and rotating it in a clockwise direction.
- c. Clean equipment and prepare for turn in.

3.2.2 CD/TDTD Replacement.

- a. Install the batteries in the CD/TDTD.

3.3 DISASSEMBLY PROCEDURES FOR THE CD/TDTD.

- a. Remove the batteries from the CD/TDTD.
- b. Clean and inspect equipment. If there is any damage to the equipment, report damage on the appropriate form (a separate form for each piece of equipment) and turn in with damaged equipment.
- c. Place equipment in the transit case.

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PART II- REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS								
PUBLICATION/FORM NUMBER				DATE		TITLE		
PAGE NO.	COLM NO.	LINE NO.	FEDERAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPROTED	RECOMMENDED ACTION

PART III - REMARKS <i>(Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)</i>								
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